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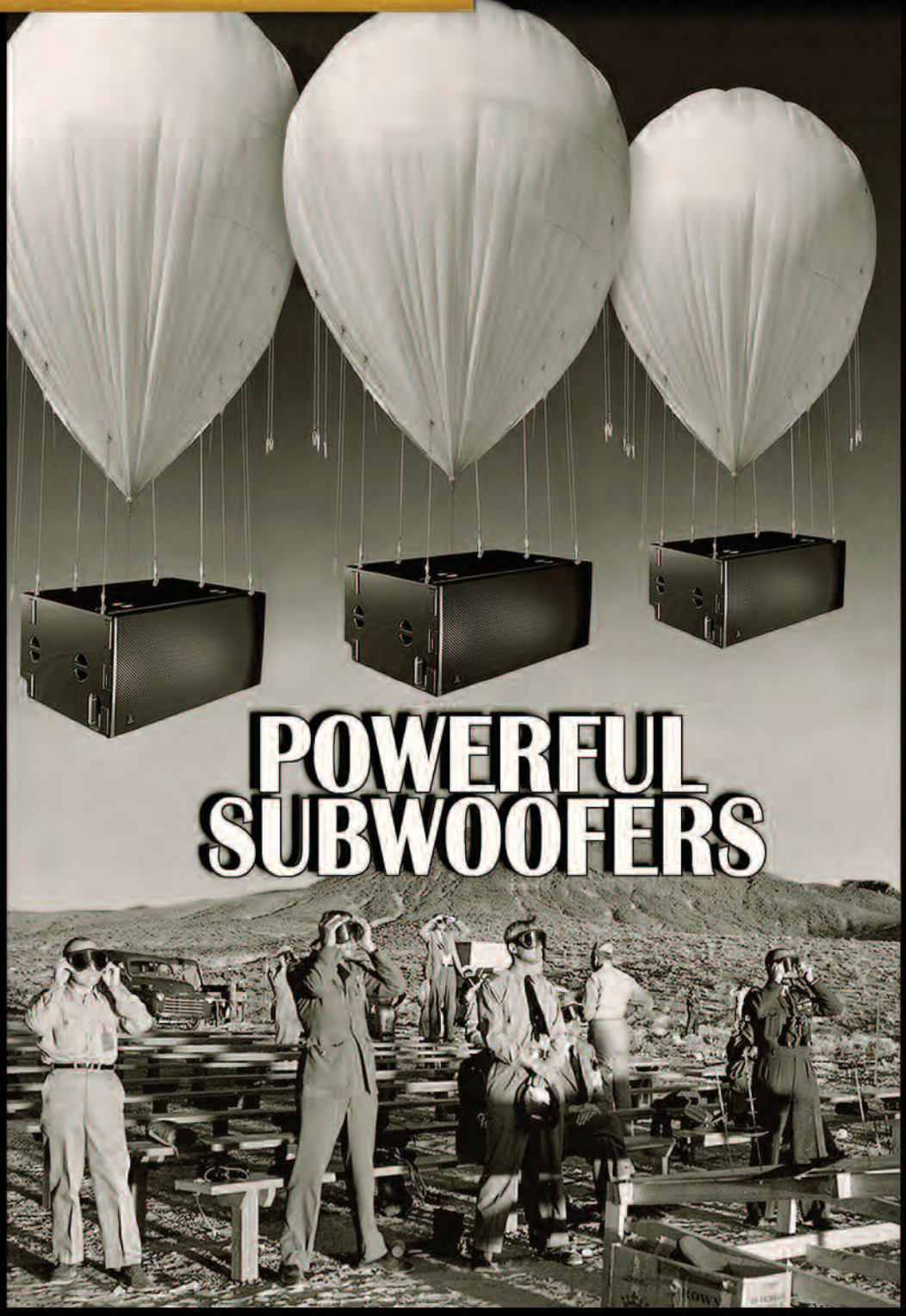


POWERFUL SUBWOOFERS

Fresh Take On Analog Mixing

Inside new Allen & Heath GL Series consoles

By Carey Davies

In researching the design for the third generation GL Series consoles, we first looked to identify the key factors in choosing an analog console for mixing live sound. This was the great chance to take advantage of our years of experience developing and manufacturing consoles for this application, talking to users and spending time at the "sharp end" behind the controls.

We also examined how the live sound application has evolved in recent years, most strikingly, the leap in audio system power and quality, the sheer number of sources and feeds involved, and the complex requirements now faced by even the lower budget operators.

The largest frame size in the new GL Series, the GL4800.

Price, of course, is the aspect that has remained tightly capped. It was obvious we faced a tough challenge to enhance the performance and functional capability over the previous GL range and still retain the clear benefits of an analog console – affordability and ease of use.

And regardless of price, reliability remains paramount. Earlier GL models gave us a solid foundation to build on, and we were confident that our individual card, semi-modular construction method and choice of components was right for the job.

Sound quality, too, is high on the list when it comes to talking about console choice. We had a lot to draw on from the development of our more recent consoles, such as the flagship ML Series.

Ease of use also remains a key point for those who want a quick, walk-up-and-mix solution, especially where non-technical operators are involved. However, it's the number of inputs and outputs (I/O) and functionality versus cost that represent the starting point for most in choosing a console that is right for their application.

The new GL design has been driven by the need to provide a lot more I/O and functional capability without compromising quality, usability or cost. Who would have thought even a few years back that an affordable console such as the GL2800 would pack a 56-channel, 10-auxes, left-center-right (LR and C buses), four-matrix architecture into a package 6 feet wide and 25 inches deep?

Years ago, Allen & Heath pioneered dual functionality, devising the concept of being able to apply one

console to properly mix front-of-house (FOH) or stage monitors. It makes perfect sense. For the cost of a few clever "mode" switches, the console architecture can be optimized for either application. And if done properly, no controls are redundant.

REFINING FUNCTION

The new GL takes the principles established by the previous models and further refines the function for the new applications such as in-ear monitoring (IEM), aux-fed subs and ambient-enhanced matrix mixing.

The first requirement is that all the main outputs are provided with 100-mm faders, inserts for patching in equalizers, +4 dBu balanced XLR output for driving long cables to the amp racks, and dedicated meters, mutes and AFL monitoring for each. This is done by swapping the group and aux control sections, and in the case of the smaller models, which have the XLRs and inserts on the groups only, the connectors reverse too.

The groups should continue to feed the matrix and subgrouping to LR while in monitor mode, a feature now added to all models. One benefit is that you can use the groups to create additional monitor mixes from the matrix, presenting new opportunities for in-ear mixing using a compact console.

Another requirement is that the main "C" fader and associated XLR output can be configured as the engineer's wedge monitor feed providing the same control and "feel" as the stage monitors being checked.

The mode switches should also be protected from accidental operation during the show. The GL does this by recessing these switches for operation using a pointed object to prevent mistakes when mixing.

A look at the functionality and features of the GL2800 master section.

MODERN MULTI-OUTPUT

Perhaps the biggest addition to the new GL models is the matrix. We recognize this as becoming increasingly useful in modern multi-output mixing, so much so that it is proving invaluable even on a small format mixer such as the GL2400.

The matrix provides a versatile "toolbox" of outputs for many applications. These outputs can be used to feed delay fill loudspeakers, for acoustically compensated mono or stereo recordings, hard-of-hearing loops, patching in the support act console, creating additional monitor mixes and more.

Take this GL2400 recording example: It is equipped with four matrices, each fed from the four groups, L, R and an external line input. These inputs are normalled through their sockets so that plugging in just one source feeds all four matrix mixes, plugging into the first pair feeds 1-2 and 3-4 in stereo, and plugging into all allows independent input.

Two independently balanced stereo mixes could be created, for example, to feed separate audio and video recorders. Ambient microphone sources could be plugged into external inputs 1 and 2. These feed both pairs of matrices in stereo adding the required amount of audience reaction to each mix.

The design philosophy was to maximize capability versus size and cost. This was the thinking behind the two multi-function stereo channels, each of which include a mic preamp and two independently controlled stereo line inputs with several different modes of operation.

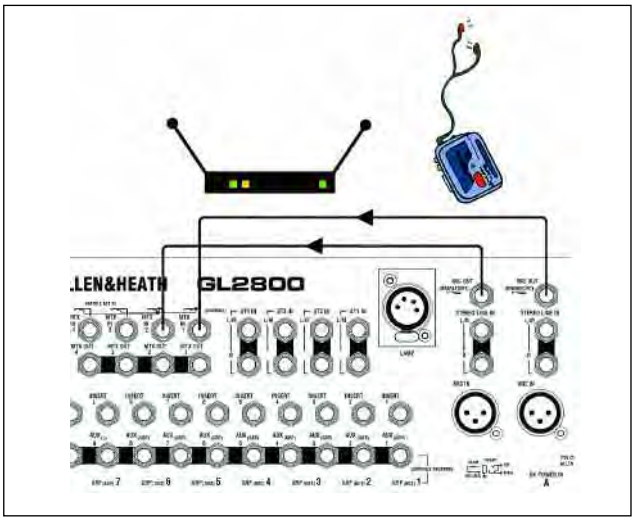
Mix the stereo inputs together into one channel strip, for example, to combine two sound effects players or reverb returns, or use the strips as mono mic channels while the stereos are routed direct to the LR mix providing up to four "short" returns.

There is even the facility to patch the unused mic preamps elsewhere, for example into the matrix as described above to create the ambient enhanced recordings, or to use with an analyzer mic.

The matrix provides a further means of creating quick monitor mixes, in much the same way as the new breed of distributed monitor systems provide mixing from groups of signals. The external inputs may be used to add ambience to closed in-ear monitors using the stereo channel microphone cross-patching method, or alternatively, to add "more me" signals patched from the channel direct outputs or auxes. The GL2800 offers the capability to create up to 17 monitor mixes comprising eight mono, four stereo and the engineer's wedge from the 10 aux, LR, C and four matrix outputs.

Additional facilities have been introduced to make the new GL more capable for mixing IEM. One aspect we focused on is the ability for the engineer to listen to the mix as the musician would hear it. Apart from the wedge monitor output, the GL2800 and GL3800 provide true stereo headphone monitoring of stereo mixes created from aux 9-10 and the matrix, even down to the inclusion of a 3.5 mm socket for plugging in an earpiece.

The matrix is a big addition, helping meet multi-output mixing needs.



The interconnectivity of the rear panel (GL2800), with the diagram illustrating the bringing of mic inputs of the stereo input modules into the matrix in order to add ambience for things like IEM.

WHAT IS NEEDED

An application that is gaining popularity is to feed the sub bass loudspeakers with their own mix. This helps clean up the sound by putting just what is needed into the subs, typically kick and bass, and keeping out low frequency pickup from the other stage mics. While a C mix - as on the GL2800 – can do the job just fine, the smaller GL2400 offers a new option to use post-fade aux 6 as the sub feed for true aux-fed subs.

The important point here is that the sub master level is re-routed to the M fader and balanced XLR making it easier to maintain the balance between subs and tops when adjusting the PA master levels.

The GL4800 at the top of the range provides additional live recording capability with its group outputs selectable pre or post master fader, and both these and the channel direct outputs routable through trim pots to match the levels to the recorder. This console introduces a switched Q equalizer, balanced inserts, and an onboard MIDI-capable snapshot memory system for the more sophisticated application.

Plenty of configurable options are provided, mostly set internally, although the GL2800 and GL3800 take the pre/post EQ aux setting to the front panel. The new GL consoles retain the per channel aux pre/post fader switching. We believe that global pre/post switching, while convenient for the operator, is restrictive to the application. Switches per channel make it possible to deal with situations such as theatre monitor sends combining stage and radio mics. The stage mics would be set pre-fade to maintain consistent level in the monitors but the radio mic channels should be set post-fade to follow the scripted fader movements and thus prevent noise such as offstage talk or out of range hiss getting to the monitor mix.

FINDING ITS FEET

Of course, the one thing that still attracts users to the analog console is its ease of use. In a world where the digital alternative is still finding its ergonomic feet with some users, the familiar layout of a well-designed analog console can be reassuring.

Live mixing is far removed from the more relaxed studio. It's about working under pressure, making quick decisions and dealing with

problems in a non-ideal world. Our objective has been to make the layout as clear and logical as possible for walk-up-and-go mixing so typical of the smaller festivals and events.

Versatility is a good thing, but not a lot of use if it's confusing or lost among the controls. We paid special attention to many aspects of the design: The shape of the console for operating comfort and control reach, the compact footprint for space-saving installation and flight casing, visibility of the meters and indicators in a way that avoids information overload, working under different lighting conditions, color-coding and logical grouping of the controls, the ability to check and monitor any signal, to communicate with the stage, and line-up and test the equipment.

With the huge recent advances in amplifier and loudspeaker design, as well as the high-powered - and often over-powered - systems now affordable, it has become increasingly important to focus on the sonic performance of our new designs.

Remember the days when a -70 dBu noise floor was deemed acceptable because it far exceeded the performance of the tape recorder to be connected? Now a good 20 dB better than that is the norm.

How the GL2800 looks under the hood.

PLENTY OF DISCUSSION

Equipment "sound quality" has become one of the most subjective and emotive subjects talked about in our industry, particularly the console mic preamp. There is a lot of mix engineer discussion about the "sound" of the mic pre but, while this interface to the outside world is very important, it is by no means the only part of the signal chain that matters.

To properly address the issue, we needed to examine the full signal path from input to output. In fact, the mix bus head amp, the circuit that combines the sources into the mix, is a very underrated discussion point, particularly regarding its dynamic performance. The circuit developed for the new GL uses a differential transistor front end referenced to a compensating ground bus resulting in a mix noise reduction of around 6 dB (half the noise), a welcome and noticeable improvement for users working with high-powered FOH and monitor rigs.

The mix amp is structured to work at -2 dBu rather than 0 to achieve extended headroom of +23 dB. This makes the console forgiving of a "hot" mix, avoiding distortion where it is most at risk - the bus itself. Based on our more recent circuit developments, we set about making the mic preamp more transparent and better able to handle transient peaks.

We regard the input headroom of the mic pre as ultra important, especially with the new breed of high output microphones and dBfs normalized line sources available today. Both the XLR and TRS jack can accept a source as high as +34 dBu, ensuring plenty of margin for hot signals from the stage without the need for external padding. The EQ was also re-engineered to make its gain controls more responsive, particularly around mid-point.

Part of the GL Series story has been the ability to offer users plenty of choice. The new series continues this with the introduction of over 40 variants of the four models, with frame sizes from 16 to 56 channels, and with some models offering a variety of stereo channel layouts. For those who want more channels feeding the mix, our proprietary Sys-Link console linking option is available. ■

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